# CLAIMS

1. Method for communication between nodes in a multi-carrier system, utilising a set of carriers and having a predetermined symbol length, the method comprising the steps of:

- reserving a sub-set of carriers for communication between unsynchronised nodes,

at least one respective carrier of said sub-set of carriers being assigned to nodes in the multi-carrier system,

whereby a relation between node identity of said nodes and said at least one carrier being created;

- transmitting a sinusoidal signal , being phase-continuous, on said at least one carrier of the sub-set of carriers for a first node during a predetermined transmission period,

the predetermined transmission period corresponding to the duration of n consecutive ones of the predetermined symbol length, where n is an integer larger than 1,

- receiving the transmitted sinusoidal signal in a second node; and

- interpreting the received sinusoidal signal, in turn comprising associating at least a frequency of the received sinusoidal signal with information about the identity of the first node, whereby the existence of the first node within radio communication distance is concluded.

2. Method according to claim 1, wherein the step of interpreting the received sinusoidal signal comprises the further steps of:

- deriving a relative Doppler as a frequency difference between the received sinusoidal signal and an expected frequency associated to the first node; and

- associating the relative Doppler to a velocity component of the second node in the direction of the first node.

3. Method according to claim 2, wherein the step of interpreting the received sinusoidal signal comprises the steps of:

- associating a sign of the relative Doppler to information about if the second node moves towards or away from the first node.

4. Method according to claim 1, wherein the step of interpreting the received sinusoidal signal comprises the steps of:

- deriving a relative path loss as an averaged received signal strength compared with a transmission strength of the first node; and

- associating the relative path loss to an estimate of the distance between the first and second nodes.

5. Method according to any of the claims 1 to 4, comprising the further steps of:

- altering characteristics of the sinusoidal signal in the first node between consecutive ones of the predetermined transmission periods in accordance with a coding of data to be sent between unsynchronised nodes;

- decoding the received sinusoidal signal in the second node to obtain the sent data.

6. Method according to claim 5, wherein the decoding is performed on every n:th received symbol.

7. Method according to claim 6, wherein the coding involves an amplitude change between the sinusoidal signal of two consecutive ones of the predetermined transmission periods.

8. Method according to claim 7, wherein the coding involves switching off and switching on, respectively, the sinusoidal signal of two consecutive ones of the predetermined transmission periods.

9. Method according to claim 6, wherein the coding involves a phase shift between the sinusoidal signal of two consecutive ones of the predetermined transmission periods.

10. Method according to any of the claims 5 to 9, wherein a sinusoidal signal is transmitted on at least two carriers of the predetermined sub-set of carriers, whereby the coding of data to be sent between unsynchronised nodes utilises the at least two carriers of the predetermined sub-set of carriers.

11. Method according to claim 10, wherein the coding of data to be sent between unsynchronised nodes utilises time differences between the onset of the sinusoidal signal of at least two of the at least two carriers of the predetermined sub-set of carriers.

12. Method according to any of the claims 1 to 12, wherein the first node is a base station and the second node is a mobile terminal.

13. Method according to claim 12, wherein the data to be sent between unsynchronised nodes comprises data assisting in procedures of changing base station.

14. Method according to claim 12, wherein the data to be sent between unsynchronised nodes comprises data assisting in paging procedures.

15. Method according to any of the claims 12 to 14, wherein the data to be sent between unsynchronised nodes comprises data selected from the list of:

load indication; and

possible random access channels.

16. Method according to any of the claims 1 to 12, wherein both the first node and the second node are base stations, whereby the data to be sent between unsynchronised nodes comprises data assisting in procedures of synchronising base stations.

17. Method according to any of the claims 1 to 12, wherein both the first node and the second node are mobile terminals.

18. Method according to any of the claims 1 to 17, wherein the carriers of the sub-set of carriers reserved for communication between unsynchronised nodes are distributed over the frequency band of the set of carriers.

19. Method according to any of the claims 1 to 18, wherein the carriers of the sub-set of carriers reserved for communication between unsynchronised nodes are equidistant in frequency.

20. Method according to any of the claims 1 to 19, wherein the multi-carrier system is a orthogonal frequency division multiplexing system.

21. Node, being a multi-carrier wireless-communication system node, comprising:

- signal processor arranged to provide signals having a predetermined symbol length on a set of carriers; and
- transmitter arranged to transmit the signals provided by the signal processor,

a predetermined sub-set of carriers being reserved for communication between unsynchronised nodes,

at least one respective carrier of said sub-set of carriers being assigned to nodes in the multi-carrier system,

whereby a relation between node identity of said nodes and said at least one carrier being created,

the signal processor being further arranged to provide a sinusoidal signal, being phase-continuous, on said at least carrier assigned to the node during a predetermined transmission period of n times the predetermined symbol length, where n is an integer larger than 1.

22. Node according to claim 21, wherein the signal processor comprises means for inverse Fourier transform.

23. Node according to claim 22, wherein the signal processor further comprises:

- means for switching off outputs from an encoder corresponding to the predetermined sub-set of carriers; and

- signal generator providing a sinusoidal signal corresponding to a carrier in the predetermined sub-set of carriers being associated with the node,

- adder means, arranged to add the output signals from the signal generator and the means for inverse Fourier transform.

24. Node according to claim 22, wherein the signal processor further comprises:

- means for switching off outputs from an encoder corresponding to carriers of the predetermined sub-set of carriers not being associated with the node; and

- means for providing a rotation of the data symbol of the input to the means for inverse Fourier transform corresponding to carriers of the predetermined sub-set of carriers not being associated with the node,

the rotation compensating for a phase rotation during cyclic prefix and roll on/off periods for the carrier in question.

25. Node, being a multi-carrier wireless-communication system node, comprising:

- receiver arranged to receive signals having a predetermined symbol length on a set of carriers; and

- signal processor arranged to process the signals provided by the receiver,

the signal processor being further arranged to:

- detect any existence of a sinusoidal signal, being phase-continuous, on at least one of a predetermined sub-set of carriers,

the predetermined sub-set of carriers being reserved for communication between unsynchronised nodes,

at least one respective carrier of said sub-set of carriers being assigned to nodes in the multi-carrier system,

whereby a relation between node identity of said nodes and said at least one carrier being created; and

- interpret at least a frequency of the received sinusoidal signal as information about the identity of a node transmitting the received sinusoidal signal.

26. Node according to claim 25, wherein the signal processor comprises means for Fourier transform.

27. Node according to claim 26, wherein the signal processor comprises means for detecting intensity on any output from the means for Fourier transform corresponding to the predetermined sub-set of carriers.

28. Node according to any of the claims 21 to 27, wherein the multi-carrier system is a orthogonal frequency division multiplexing system.

29. Node according to any of the claims 21 to 28, wherein the node is a base station.

30. Node according to any of the claims 21 to 28, wherein the node is a mobile terminal.

31. A wireless communications system comprising a node according to any of the claims 21 to 30.

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